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Two new species of Ceratocanthinae from the Dayao Mountains, Guangxi, China (Coleoptera: Hybosoridae)

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Abstract: Two new species of ceratocanthine beetles, namely *Cyphopisthes erlangshen* **sp. nov.** and *Madrasostes lini* **sp. nov.**, are herein described from the Dayao Mountains, Guangxi, China. The former represents a new national record for the genus *Cyphopisthes* Gestro, 1899. Illustrations of the habitus and diagnostic characters of both species are provided.

Keywords: *Cyphopisthes*, *Madrasostes*, morphology, new genus record, Oriental region, pill scarab beetles, taxonomy

中国广西大瑶山球金龟亚科两新种（鞘翅目：驼金龟科）

王成斌

森林与草原防灾减灾工程研究中心，绵阳师范学院，绵阳 621000，四川省，中国

摘要：本文记述了采自中国广西大瑶山的两球金龟新种——二郎神伋球金龟 *Cyphopisthes erlangshen* **sp. nov.** 与林氏玛球金龟 *Madrasostes lini* **sp. nov.**。其中伋球金龟属 *Cyphopisthes* Gestro, 1899 系中国新记录属。文中提供两新种整体形态与鉴别特征图版。

关键词：伋球金龟属，玛球金龟属，形态，新纪录属，东洋区，球金龟，分类

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Introduction

Ceratocanthine beetles, commonly referred to as “pill scarab beetles”, belong to the family Hybosoridae (Coleoptera) and exhibit the remarkable ability to roll into a compact ball with all parts perfectly matching. This group comprises more than 360 species ascribed in 43 genera and 3 tribes (Ballerio & Grebennikov 2016).

The Ceratocanthinae fauna in China is notably limited, with merely six species recorded to date (Ballerio & Bezděk 2016; Jiang *et al*. 2020): *Eusphaeropeltis chenchaomingi* Jiang, Ballerio, Guo & Wang, 2020 (Yunnan), *Madrasostes deharvengi* Gao, 2009 (Guangxi), *Madrasostes suzukii* Ochi, Tsai & Masumoto, 2005 (Taiwan), *Madrasostes taiwanense* Ochi, Tsai & Masumoto, 2005 (Taiwan), *Pterorthochaetes insularis* Gestro, 1898 (Yunnan) and *Pterorthochaetes yunnanensis* Ballerio, 2014 (Yunnan).

In the present study, a new species of the genus *Cyphopisthes* Gestro, 1899 and a new species of the genus *Madrasostes* Paulian, 1975, both associated with *Hodotermopsis sjostedti* Holmgren, 1911 (Isoptera: Termopsidae), are described. These specimens were collected from several different nests at a single site in the Dayao Mountains, Guangxi Zhuang Autonomous Region, China. It is worth noting that this study marks the first record of the genus *Cyphopisthes* in China. Detailed illustrations of the diagnostic characters of both new species are provided.

Material and methods

Specimens were initially relaxed and softened in an HH-2 digital homoeothermic water bath maintained at 44.4°C for 6 hours, after which they were immersed in distilled water for cleaning and dissection. To examine the genitalia, the abdomens were detached using fine-tipped tweezers and subsequently cleared with a trypsin enzyme solution at room temperature for 12 hours. Thereafter, they were placed in a 70% ethanol solution to remove residual trypsin. Following examination, the dissected body parts were mounted on a slide using Euparal Mounting Medium for future studies. Digital images were acquired with a Canon MP-E 65 mm macro photo lens on a Canon 5DsR camera, and images of the same object taken at different focal planes were merged using Zerene Stacker 1.04 stacking software. Post-processing of the images was performed with Adobe Photoshop CS6. Morphological terminology adheres to Ballerio & Grebennikov (2016), while the punctation patterns of the integuments follow the conventions set forth by Ballerio *et al*. (2011) and Ballerio (2013). Measurement criteria, expressed in millimetres (mm), are based on the standards of Jiang *et al*. (2020, 2021). The type material of the new species is deposited in the Invertebrate Collection of Mianyang Normal University, Mianyang, China (**MYNU**).

Abbreviations used in the parentheses of figure labels are as follows: **as**—anterosuperior view, **d**—dorsal view, **ll**—left lateral view, **pi**—posteroinferior view, **rl**—right lateral view, **v**—ventral view.

Taxonomy

Family Hybosoridae Erichson, 1847 驼金龟科
Subfamily Ceratocanthinae Martínez, 1968 球金龟亚科
Genus *Cyphopisthes* Gestro, 1899 伛球金龟属

Type species: *Cyphopisthes amphicyllis* (Sharp, 1875), by original designation.

10 spp. in Ocampo & Ballerio (2006) and 12 spp. in Ballerio & Grebennikov (2016).

A large number of generic characters are not reiterated in the following description of the new species; consult Paulian (1978), Ballerio (2013) and Ballerio & Grebennikov (2016) for diagnostic characters of the genus.

Cyphopisthes erlangshen sp. nov. 二郎神伛球金龟

https://zoobank.org/0877CFE7-1F6E-4FEA-87ED-5AB1B982FDBA

Figs 1A–C; 2A–E; 3

Type material. Holotype: ♀ (MYNU), **CHINA, Guangxi:** Laibin City, Jinxiu County, Dayao Mountains [大瑶山], 24.10089169°N 110.18736357°E, 1124 m, in nest of *Hodotermopsis sjostedti*, 20.XII.2024, Wen-Yong Feng [冯文勇] leg.

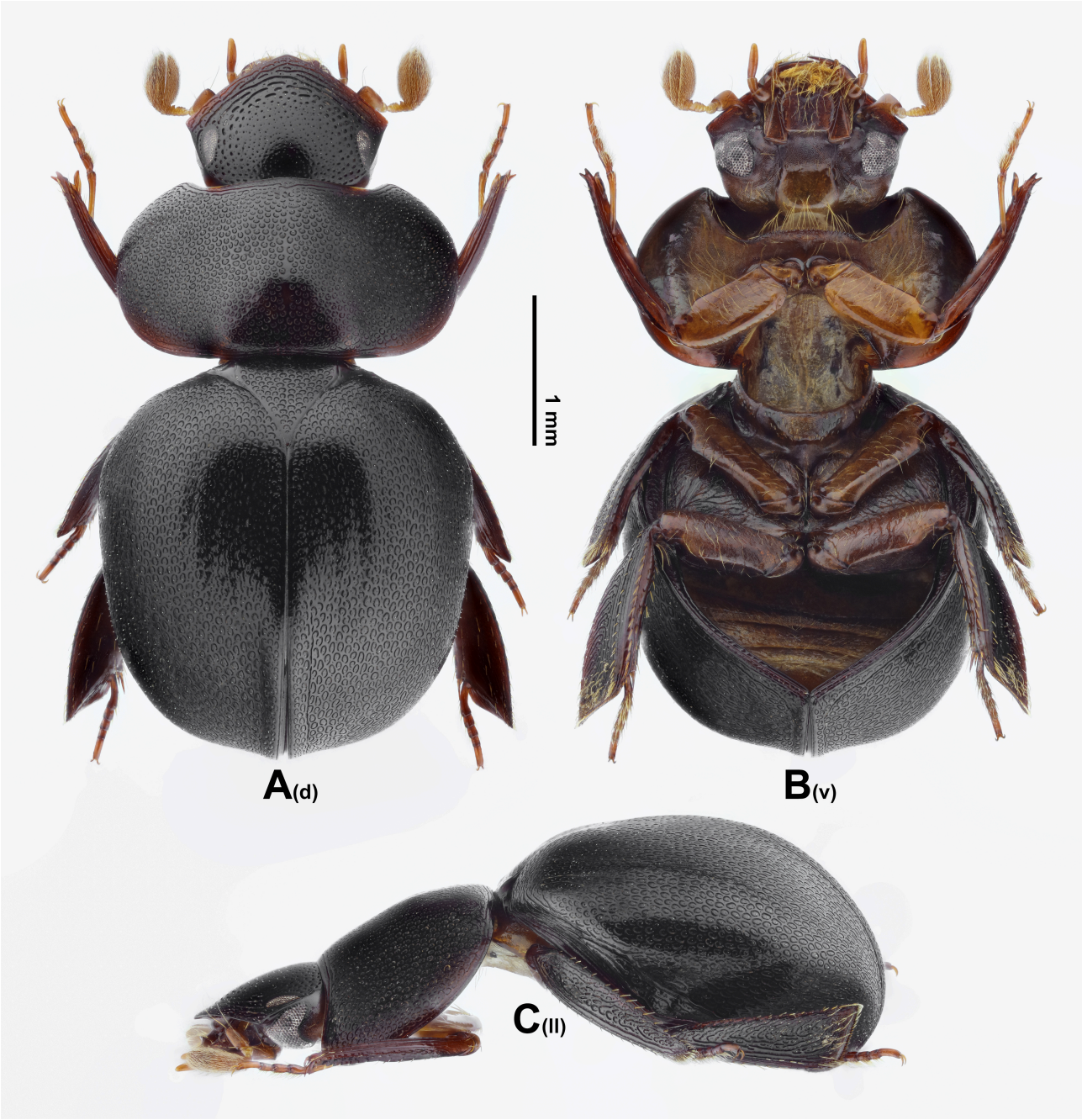

FIGURE 1. Habitus of *Cyphopisthes erlangshen* **sp. nov.**, ♀, holotype.

Etymology. The specific epithet is from the name "Erlang Shen [二郎神]", a distinguished and iconoclastic figure in Chinese mythology, celebrated for his extraordinary supernatural abilities and defiant spirit. Frequently portrayed with a conspicuous third eye, he is revered as a warrior deity who dares to challenge celestial authority and epitomizes the struggle against injustice in myth and legend. The name is a noun in apposition.

Description. Female. Body size typical for the genus, 4.7 mm in length, widest around anterior ⅓ of elytra, 1.9 times as long as wide. Lengths of body parts (mm): head (0.8), pronotum (1.2), elytra (2.7); width: head (1.4), pronotum (2.3), elytra (2.5).

Habitus (Figs 1A–C). Body suboval, moderately shiny. Body color mainly blackish; antennae brown; mouthparts (except mandibles), narrow areas along anterior margin of clypeus and posterior margin of pronotum, prolegs, ventral sides of meso- and metafemora, and sterna more or less reddish brown. Dorsum sparsely covered with rather fine, short, erect, whitish thin setae; venter sparsely covered with moderately long, semierect, yellowish setae.

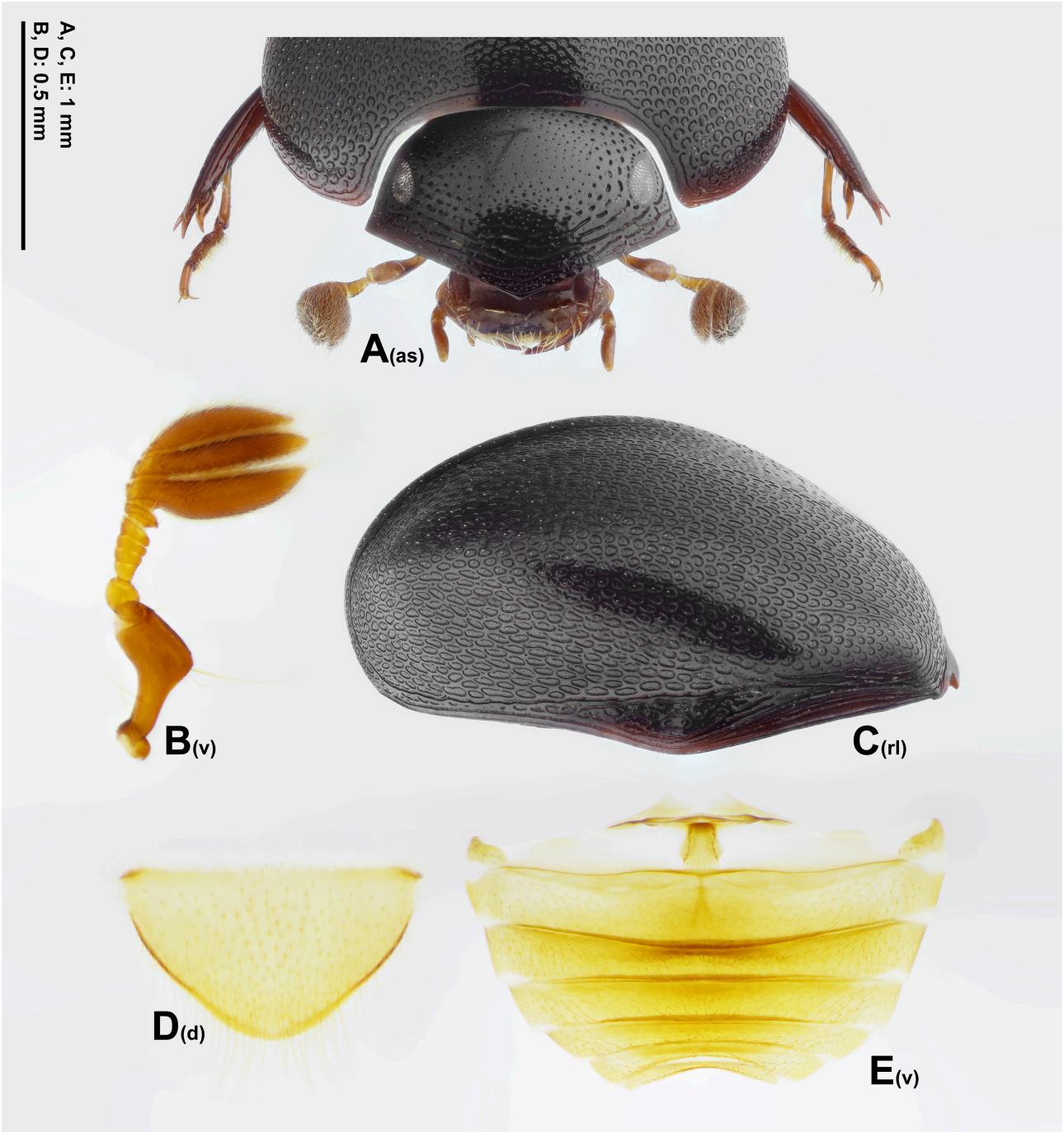

FIGURE 2. Characters of *Cyphopisthes erlangshen* **sp. nov.**, ♀, holotype: **A** head **B** right antenna **C** right elytron **D** tergite VIII **E** sternites III–VIII.

Head (Fig. 2A) weakly convex, 1.6 times as wide as long, 0.6 times as wide as pronotum. Anterior area triangular, forming an obtuse angle (about 130°) at apex; both sides of angle straight and smooth. Genae aligned with anterior margin, moderately and squarishly protruding laterally; genal canthus completed, reaching occipital

area. Eyes with visible facets; dorsal ocular area small, interocular distance about 10.4 times maximum width of dorsal ocular area; ventral ocular area large. Punctation moderately dense and impressed; disc with simple punctures, interstices with fine simple pores; sides with short comma-shaped punctures centrifugally oriented, each with an inner opening and a fine simple pore innerly; anterior area of clypeus with 3 or 4 irregular anastomosing transverse lines.

Antennae (Fig. 2B) 10-segmented; scape strongly securiform; pedicel subglobular; flagellomere 1 cupulate, about as long as wide; flagellomeres 2–4 transverse; flagellomere 5 strongly transverse; antennal club with three flagellomeres (6–8) uniformly setose.

Pronotum weakly convex, 1.9 times as wide as long, widest around posterior ⅖. Margin completely bordered; anterior angles (Fig. 2A) rounded; posterior margin gently emarginate in median part. Punctation dense and shallow; disc with large, almost closed, horseshoe-shaped punctures, each with an anterior opening and a fine simple pore inside; sides with same type of punctures but larger, each with a lateral opening and a fine simple pore inside; interstices 0.2–0.3 times as wide as puncture diameters.

Scutellar shield covered by dense, large, shallow horseshoe-shaped punctures, each with a posterior opening and a fine simple pore posteriorly.

Elytra (Fig. 2C) strongly convex, 1.1 times as long as wide, widest around anterior ⅓, 1.2 times as long as pronotal width. Humeral callus indistinct. Punctation dense and shallow; disc with large, horseshoe-shaped punctures, each with a posterior opening and a fine simple pore in middle; sides with same type of punctures but longitudinally enlarged; interstices 0.3–0.4 times as wide as puncture diameters. Two short longitudinal lines starting at humerus and occupying about anterior ¼. Sutural stria shallow and visible in about posterior ¼. Inferior sutural stria present nearly entire elytral length, progressively attenuating anteriorly. Articular area with about 4 longitudinal striae. Marginal area with some anastomosing longitudinal lines and some large, longitudinally expanded horseshoe-shaped punctures, most with lateral openings. Articular process well developed, surface smooth.

Wings fairly developed.

Legs. Protibia smooth along outer margin, except two large apical teeth; one inner apical spur, bisinuate, strongly bent down in apical part. Mesotibia with one straight inner apical spur. Metatibia with two straight inner apical spurs, the inferior one longer.

Abdomen. Tergites and sternites moderately densely covered with fine punctures; tergite VIII (Fig. 2D) relatively small, narrowly rounded at posterior margin; sternite III (Fig. 2E) with paired oblique seta rows centrally; sternite VIII (Fig. 2E) extremely transverse.

Female genitalia (Fig. 3). Gonocoxite in segmental shape, with 4 or 5 setae at apex. Spermatheca C-shaped.

Male. Unknown.

Host. *Hodotermopsis sjostedti* Holmgren, 1911 (Isoptera: Termopsidae).

Distribution. China (Guangxi).

Differential diagnosis. Geographically, the congeneric species most closely allied to *Cyphopisthes erlangshen* **sp. nov.** include *C. minutus* Paulian, 1978 from Malaysia, as well as *C. wallacei* (Pascoe, 1860) and *C. crux* (Sharp, 1875), both from West Malaysia and Indonesia. Nevertheless, the new species can be differentiated from them by its marginal area, which is covered with some anastomosing longitudinal lines and some large, longitudinally expanded horseshoe-shaped punctures. In contrast, the latter three species exhibit entirely different patterns of punctation or sculpture on this area.

Morphologically, the new species is similar to *C. descarpentriesi* Paulian, 1977 from Australia; however, it is differentiated from the latter through the following characters (*C. descarpentriesi* in parentheses): body color mainly blackish (body color mainly reddish brown), interocular distance about 10.4 times maximum width of dorsal ocular area (interocular distance about 6.0 times maximum width of dorsal ocular area), head disc with simple punctures (head disc with very short transverse comma-shaped punctures), pronotal puncture relatively sparser (pronotal

puncture relatively denser).

Remarks. While Jiang *et al*. (2020: 186) mentioned "We are aware of an unpublished probable record for this genus [*Cyphopisthes*] in China", the formal description of this new species presented herein constitutes the first record of this genus in China.

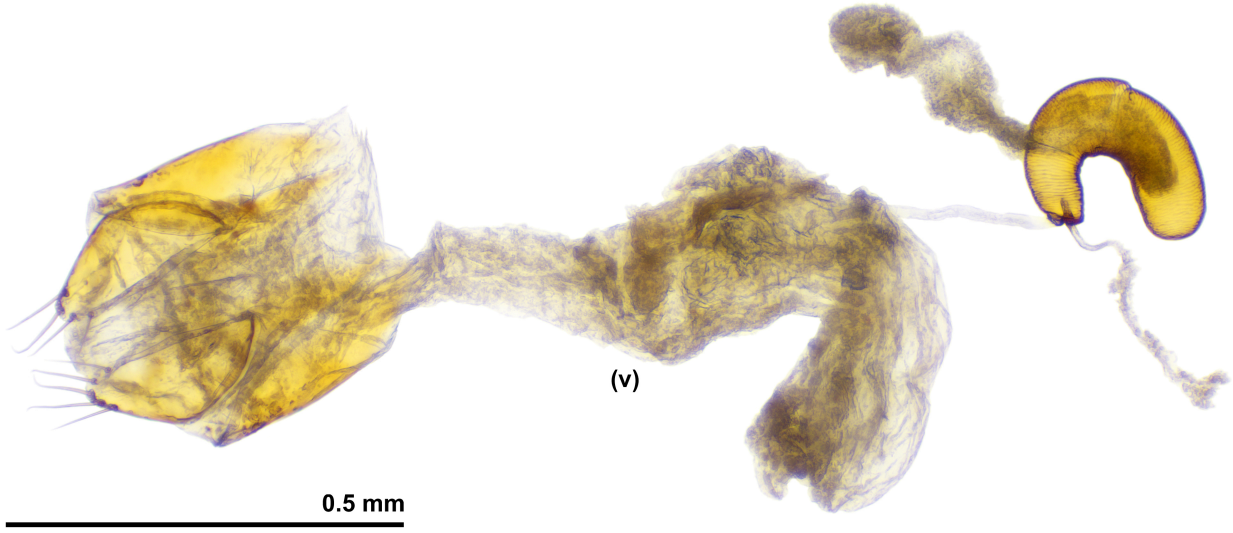

FIGURE 3. Female genitalia of *Cyphopisthes erlangshen* **sp. nov.**, holotype.

Genus *Madrasostes* Paulian, 1975 玛球金龟属

Type species: *Madrasostes nigrum* Paulian, 1975, by original designation.

28 spp. in Ocampo & Ballerio (2006) and 34 spp. in Ballerio & Grebennikov (2016).

A large number of generic characters are not reiterated in the following description of the new species; consult Paulian (1975), Paulian (1978) and Ballerio & Grebennikov (2016) for diagnostic characters of the genus.

Madrasostes lini sp. nov. 林氏玛球金龟

https://zoobank.org/E3DFAA3B-CF30-4D1F-AD17-05A34B64B1B2
Figs 4A–C; 5A–E; 6A–J

Type material. Holotype: ♂ (MYNU), **CHINA, Guangxi:** Laibin City, Jinxiu County, Dayao Mountains [大瑶山], 24.10089169°N 110.18736357°E, 1124 m, in nest of *Hodotermopsis sjostedti*, 20.XII.2024, Wen-Yong Feng [冯文勇] leg. **Paratypes:** 2♂♂ (MYNU), same data as holotype except 7.I.2025.

Etymology. The new species is dedicated to Ye-Jie Lin, a young spider taxonomist, for his unwavering support to my taxonomic study over the past decade, including providing valuable specimens, sharing his expertise in dissection techniques and imaging methodologies. The name is a noun in the genitive case.

Description. Male. Body size medium for the genus, 4.7 mm in length, widest around posterior ⅓ of pronotum, 1.8 times as long as wide. Lengths of body parts (mm): head (0.6), pronotum (1.6), elytra (2.4); width: head (1.5), pronotum (2.7), elytra (2.5).

Habitus (Figs 4A–C). Body suboval, less shiny. Body color mainly blackish; antennae brown; mouthparts (except mandibles), ventral sides of all femora, and sterna more or less reddish brown. Dorsum sparsely covered with rather fine, short, erect, yellowish clavate setae; venter sparsely covered with moderately long, semierect, yellowish setae.

Head (Fig. 5A) weakly convex, 2.3 times as wide as long, 0.6 times as wide as pronotum. Anterior area

subrounded, forming a roundly obtuse angle (about 150°) at apex; both sides of angle slightly arcuate, irregularly finely serrated. Genae almost aligned with anterior margin, slightly and roundly protruding laterally; genal canthus developed but not reaching occipital area. Eyes without visible facets; dorsal ocular area rather small, interocular distance about 26.6 times maximum width of dorsal ocular area; ventral ocular area small. Sculpture dense and deeply impressed; surface entirely with irregular anastomosing lines, centrifugally oriented at sides, intervals with small simple pores and almost as wide as anastomosing lines.

Antennae (Fig. 5B) 10-segmented; scape clavate; pedicel subglobular; flagellomere 1 cupulate, about as long as wide; flagellomeres 2–4 transverse; flagellomere 5 strongly transverse; antennal club with three flagellomeres (6–8) uniformly setose.

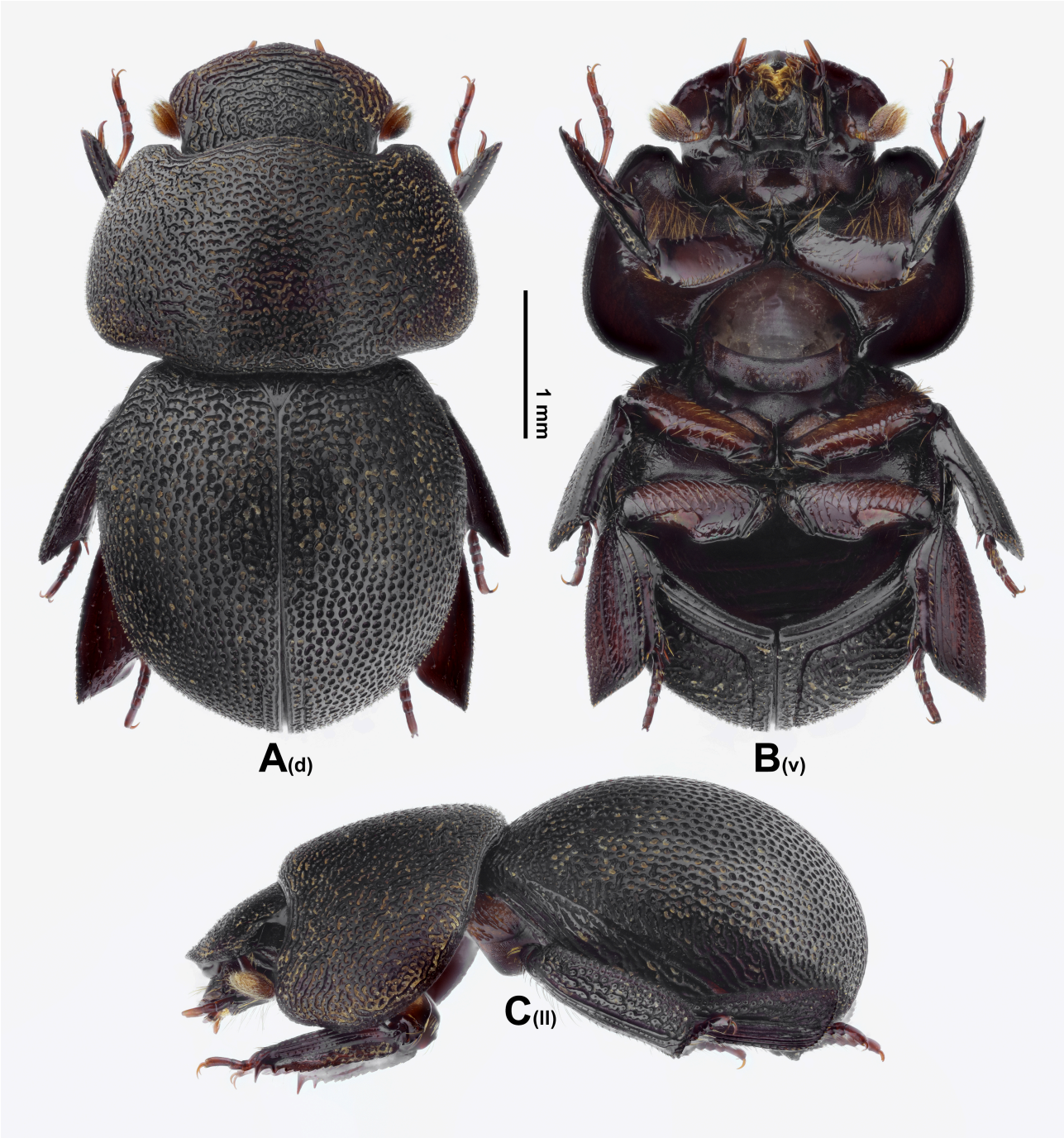

FIGURE 4. Habitus of *Madrasostes lini* **sp. nov.**, ♂, holotype.

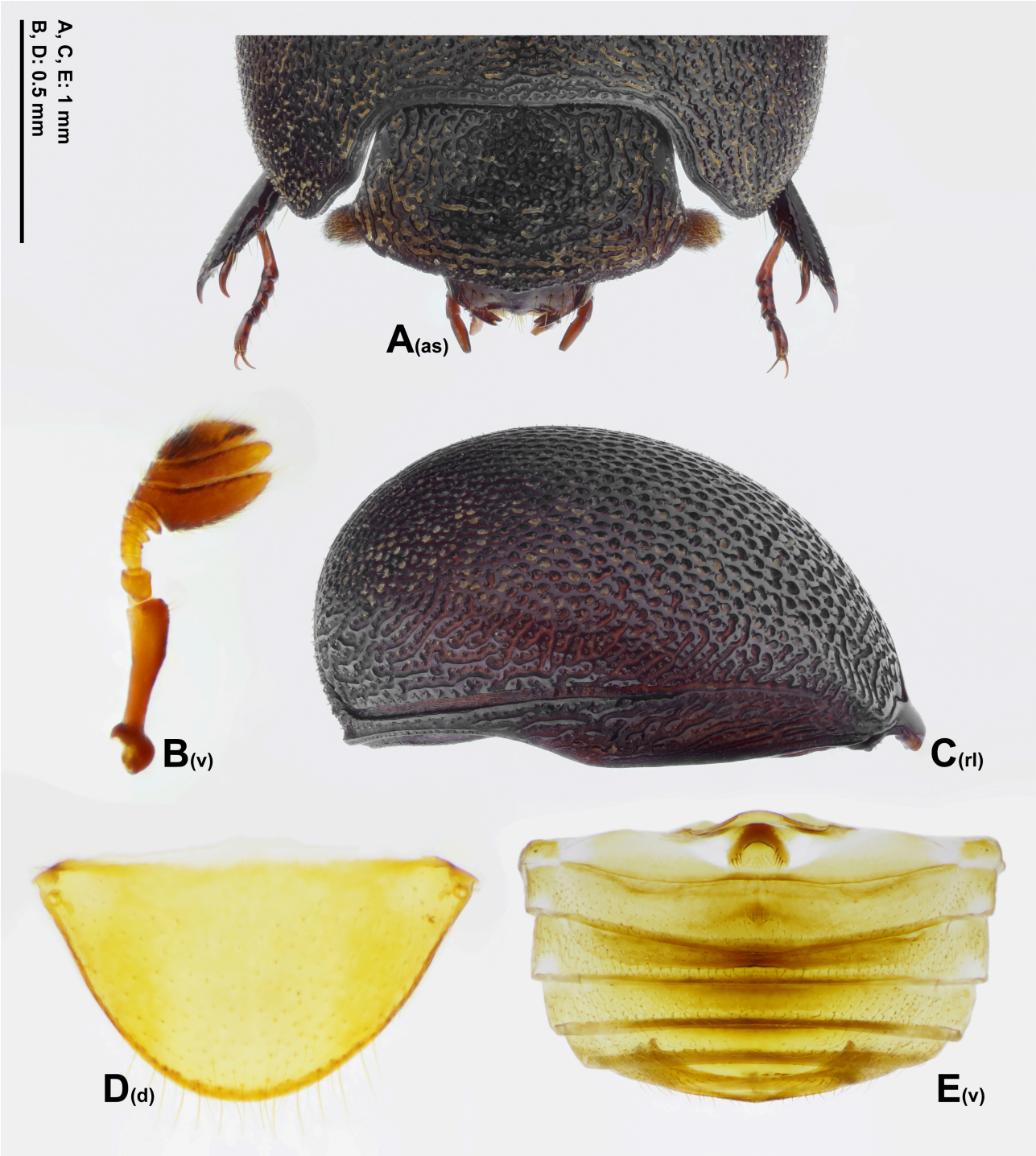

FIGURE 5. Characters of *Madrasostes lini* **sp. nov.**, ♂, holotype: **A** head **B** right antenna **C** right elytron **D** tergite VIII **E** sternites III–VIII.

Pronotum weakly convex, 1.7 times as wide as long, widest around posterior ⅓. Margin completely bordered; anterior angles (Fig. 5A) rounded; posterior margin gently emarginate in median part. Sculpture dense and deeply impressed; surface entirely with irregular anastomosing lines, lengthened at sides, intervals with small simple pores and almost as wide as anastomosing lines.

Scutellar shield covered by dense and deeply impressed anastomosing lines, intervals with small simple pores.

FIGURE 6. Characters of *Madrasostes lini* **sp. nov.**, ♂, holotype: **A–D** genital segment **E, F** aedeagus **G** parameres **H** left paramere **I** right paramere **J** median lobe & internal sac.

Elytra (Fig. 5C) strongly convex, as long as wide, widest around anterior ⅓, 0.9 times as long as pronotal width. Humeral callus indistinct. Sculpture dense and deeply impressed; disc with rather large, comma-shaped punctures, each with a small simple pore posteriorly, sometimes connect to each other forming longitudinal lines; basal area and sides with irregular anastomosing lines, intervals with small simple pores and narrower than anastomosing lines. Sutural stria impressed and visible in about posterior ⅙. Inferior sutural stria rather wide, gradually narrowing anteriorly and absent in anterior ⅐ of elytral length. Articular area rather narrow. Marginal area with wide anastomosing lines, intervals with fine simple pores; intervals narrower than anastomosing lines. Articular process well developed, surface smooth.

Wings largely reduced.

Legs. Protibia slightly denticulate along outer margin, with apical two teeth much larger; one inner apical spur, bisinuate, strongly bent down in apical part. Mesotibia with one straight inner apical spur. Metatibia with two straight inner apical spurs, the inferior one somewhat inflated.

Abdomen. Tergites and sternites moderately densely covered with fine punctures; tergite VIII (Fig. 5D) relatively large, rounded at posterior margin; sternite III (Fig. 5E) with a seta tuft centrally; sternite VIII (Fig. 5E) extremely transverse.

Male genitalia. Genital segment (Figs 6A–D) asymmetrical; sternite IX semicircular; manubrium short. Aedeagal basal piece (Figs 6E, F) twisted, about 2.3 times as long as parameres. Parameres (Fig. 6G) slightly asymmetrical, curving inwards at apices, and strongly bent dorsally in apical part (Figs 6H, I). Median lobe (Fig. 6J) subpentagonal. Internal sac (Fig. 6J) with 4 or 5 sclerites, longest one thick and flagellate.

Female. Unknown.

Host. *Hodotermopsis sjostedti* Holmgren, 1911 (Isoptera: Termopsidae).

Distribution. China (Guangxi).

Differential diagnosis. *Madrasostes lini* **sp. nov.** is distinguished from all other congeners by the presence of dense, deeply impressed anastomosing lines that cover the head, pronotum, and the basal and lateral parts of the elytra — a character not observed to such an extensive degree in any other known species of the genus. Moreover, this new species is also characterized by a strongly reduced dorsal ocular area, with the interocular distance being approximately 26.6 times the maximum width of the dorsal ocular region.

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References

Ballerio A 2013: Revision of the Australian Ceratocanthinae (Coleoptera, Scarabaeoidea, Hybosoridae). *ZooKeys*, 339: 67–91. https://doi.org/10.3897/zookeys.339.6033

Ballerio & Bezděk 2016: Family Hybosoridae Erichson, 1847. *In*: Löbl I & Löbl D (Eds) *Catalogue of Palaearctic Coleoptera. Vol. 3. Scarabaeoidea—Scirtoidea—Dascilloidea—Buprestoidea—Byrrhoidea. Revised and updated edition*. Brill, Leiden and Boston, pp. 85–87.

Ballerio A, Gill BD & Grebennikov VV 2011: Illustrated overview and identification key to Cameroonian Ceratocanthinae beetles (Coleoptera: Scarabaeoidea: Hybosoridae) with description of four new species. *Zootaxa*, 2892: 1–24. https://doi.org/10.11646/zootaxa.2892.1.1

Ballerio A & Grebennikov VV 2016: Rolling into a ball: phylogeny of the Ceratocanthinae (Coleoptera: Hybosoridae) inferred from adult morphology and origin of a unique body enrollment coaptation in terrestrial arthropods. *Arthropod Systematics and Phylogeny*, 74 (1), 23–52.
https://doi.org/10.3897/asp.74.e31837

Jiang R-X, Ballerio A, Guo L & Wang S 2020: Notes on the Chinese fauna of Ceratocanthinae (Coleoptera: Hybosoridae), with description of a new species of *Eusphaeropeltis* Gestro, 1898. *Zootaxa*, 4851 (1): 180–188.
https://doi.org/10.11646/zootaxa.4851.1.9

Jiang R-X, Ballerio A, Liu H-Y & Wang S 2021: Description of the male of *Pterorthochaetes yunnanensis* Ballerio, 2014 (Coleoptera: Scarabaeoidea: Hybosoridae: Ceratocanthinae). *Zootaxa*, 4950 (1): 196–200.
https://doi.org/10.11646/zootaxa.4950.1.12

Ocampo FC & Ballerio A 2006: Catalog of the subfamilies Anaidinae, Ceratocanthinae, Hybosorinae, Liparochrinae, and Pachyplectrinae (Scarabaeoidea: Hybosoridae). *Bulletin of the University of Nebraska State Museum*, 19: 178–209.

Paulian R 1975: Sur quelques Acanthoceridae (Coleoptera Scarabaeoidea) de l'Inde du Sud. *Revue Suisse de Zoologie*, 82 (3): 603–614.
https://doi.org/10.5962/bhl.part.78279

Paulian R 1978: Révision des Ceratocanthidae [Col. Scarabaeoidea]. II — Les espèces orientales et australiennes. *Annales de la Société Entomologique de France*, New Series, 14 (3): 479–514.
https://doi.org/10.1080/21686351.1978.12278698

Additional information

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Conflict of interest: The author has declared that no competing interests exist.

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